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EXAMINER

PETRANEK, JACOB ANDREW

ART UNIT PAPER NUMBER

2183

DATE MAILED: 11/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

08/966,954

Applicant(s)

GERARDUS DE VRIES,
JOHANNES R.

Examiner

Jacob Petranek

Art Unit

2183

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 44,45,49,50 and 63 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 44,45,49,50 and 63 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 4/14/1995 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 44-45, 49-50, and 63 are pending.
2. The office acknowledges the following papers:

Specification, claims, arguments, and abstract filed on 10/17/2006.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitation from claims 44 and 63 "a vector processing assembly code level, using which an individual instruction can be automatically repeated a programmable number of times on different data words" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d).

Maintained Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 44-45, 49-50, and 63 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The limitation from claim 44 "A second assembly code level which includes a plurality of instructions which are

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accessible to the programmer and which can explicitly reference individual outputs of any of the plurality of functional units" is not contained within the specification upon a cursory glance. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

6. Claims 45 and 49-50 are rejected due to their dependency.

New Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 44-45, 49-50, and 63 are rejected under 35 U.S.C. §103(a) as being unpatentable over Chuang (U.S. 4,766,566), in view of Labrousse et al. (U.S. 5,313,551), in view of Davies (U.S. 5,450,604), in view of Blahut et al. (U.S. 4,346,437).

9. As per claim 44:

Chuang disclosed a processor comprising:

A plurality of functional units coupled to each other to execute operations defined from an instruction set of the processor (Chuang: Figure 7 elements 24, 60, 62, and 70, column 10 lines 18-41), the plurality of functional units including an arithmetic logic unit (ALU) and a multiplier (Chuang: Figure 7 elements 24, 60, 62, and 70, column 10 lines

18-41), the instruction set having a hierarchy of instruction levels, each of which can be used by a programmer to define instructions for the processor, the hierarchy of instruction levels including:

A RISC/CISC assembly code level (Chuang: Figure 7, column 5 lines 3-20)(The processor of figure 7 executes RISC instructions.), and

Chuang failed to teach a second assembly code level which includes a plurality of instructions which are accessible to the programmer and which can explicitly reference individual outputs of any of the plurality of functional units.

However, Labrousse disclosed a second assembly code level which includes a plurality of instructions which are accessible to the programmer and which can explicitly reference individual outputs of any of the plurality of functional units (Labrousse: Column 13 lines 35-42 and column 14 lines 17-22)(The instructions that contain bypass encoding signals are available to the programmer and are implemented into the instructions upon being compiled. Labrousse disclosed instructions that can be encoded with a bypass signal that can be used to bypass register reads without having to make a comparison between addresses for instructions.).

The advantage of encoding bypass signals within an instruction is that it will save the time needed to make comparisons between source registers between instructions and it will save space on the processor, which will lower costs (Labrousse: Column 2 lines 56-62). Allowing for bypass in the instruction will also result in the register value being available sooner to the instruction needing it, which may increase performance if the register access is in the critical path (Labrousse: Column 1 lines 49-64). The

advantages of saving processor space and power, as well as increased performance would have motivated one of ordinary skill in the art to implement directly encoding bypass signals into instructions to execute. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement encoding bypass signals into instructions for the advantages of increased performance and decreased costs.

Chuang and Labrousse failed to teach a vector processing assembly code level, using which an individual instruction can be automatically repeated a programmable number of times on different data words; and a plurality of control registers, the plurality of hierarchical instruction levels further comprising a fourth level corresponding to the control registers, using which individual instruction words executed by one or more of the functional units can be extended by bits in the control registers on a per-instruction-cycle basis.

However, Davies disclosed a vector processing assembly code level, using which an individual instruction can be automatically repeated a programmable number of times on different data words (Davies: Figure 9a, column 17 lines 53-60)(Figure 9a shows the logic for a SIMD instruction. A SIMD instruction is a single instruction that operates on multiple sets of data, which is programmed into the instruction. Thus, a SIMD instruction is repeatable a number of times on different data words.).

The advantage of executing SIMD instructions is that they are able to gain performance by processing data in parallel. One of ordinary skill in the art would have been motivated by the advantage of increased performance to implement SIMD instructions on the processor of Chuang and Labrousse. Thus, it would have been

obvious to one of ordinary skill in the art at the time of the invention to implement SIMD instructions for the advantage of increased performance through parallel processing of data.

Chuang, Labrousse, and Davies failed to teach a plurality of control registers, the plurality of hierarchical instruction levels further comprising a fourth level corresponding to the control registers, using which individual instruction words executed by one or more of the functional units can be extended by bits in the control registers on a per-instruction-cycle basis.

However, Blahut disclosed a plurality of control registers, the plurality of hierarchical instruction levels further comprising a fourth level corresponding to the control registers, using which individual instruction words executed by one or more of the functional units can be extended by bits in the control registers on a per-instruction-cycle basis (Blahut: Column 8 lines 42-62)(The programmer is allowed to load data into a control register that allows for the extension of instructions within the processor. The extension can be on a per instruction basis because the programmer controls when the control register is loaded and reloaded to allow for instruction extension.).

The advantage of using a control register for instruction extension is that it allows for additional instructions to be executed within the processor. Many times, instruction opcodes may all be used, thus using a control register is a way that additional instructions can be added to the processor (Blahut: Column 1 lines 61-67 continued to column 2 lines 1-67). One of ordinary skill in the art would have been motivated to implement control registers for the advantage of allowing the instruction set architecture

to increase, even though no more opcode values may exist. Thus, it would have been obvious to one of ordinary skill in the art to implement control registers for extending instructions for the advantage of being able to add additional functionality to the processor.

10. As per claim 45:

Chuang, Labrousse, Davies, and Blahut disclosed a processor as recited in claim 44, wherein the second assembly code level comprises a native machine language of the processor (Labrousse: Column 13 lines 35-42 and column 14 lines 17-22)(The instructions that contain bypass encoding signals are available to the programmer and are implemented into the instructions upon being compiled. Labrousse disclosed instructions that can be encoded with a bypass signal that can be used to bypass register reads without having to make a comparison between addresses for instructions. The instructions are inherently native to the processor upon the combination and can be used by the processor.).

11. As per claim 49:

Chuang, Labrousse, Davies, and Blahut disclosed a processor as recited in claim 44, further comprising:

A plurality of dedicated output buses, one for each of the functional units (Chuang: Figure 7 element 63, column 10 lines 18-41)(Each functionality unit has an output bus to put the data on.); and

A plurality of bus registers, each coupled to store the output of only a corresponding one of the plurality of functional units and each coupled to only a

corresponding one of the plurality of dedicated output buses (Chuang: Figure 7 element 68, column 10 lines 18-41)(The output registers are coupled to the functional units and the output buses. Thus having the same functionality.).

12. As per claim 50:

Chuang, Labrousse, Davies, and Blahut disclosed a processor as recited in claim 49, wherein each of the dedicated output buses is coupled to an input of at least one other of the plurality of functional units (Chuang: Figure 7 elements 17 and 56, column 10 lines 18-41)(The bus lines are coupled to the inputs of the functional units through the register file.).

13. As per claim 63:

Claim 63 essentially recites the same limitations of claims 44-45 and 49-50. Therefore, claim 63 is rejected for the same reasons as claims 44-45 and 49-50.

Response to Arguments

14. The arguments presented by Applicant in the response, received on 10/17/2006 are partially considered persuasive.

15. Applicant argues "The written description rejections have been overcome by adding paragraphs 44-46 into the specification from the original appendix, which is the IMAGINE specification."

This argument is not found to be persuasive for the following reason. No support is found for a plurality of instructions being able to explicitly reference individual outputs of functional units within the added paragraphs 44-46.

16. Applicant argues "Chuang, Labrousse, and Simpson failed to teach vector processing assembly code level, using which an individual instruction can be automatically repeating a programmable number of times on different data words."

This argument is found to be persuasive for the following reason. The examiner agrees these references failed to teach this limitation. However, a new ground of rejection has been given due to the amendment.

17. Applicant argues "Chuang, Labrousse, and Simpson failed to teach a plurality of control registers, the plurality of hierarchical instruction levels further comprising a fourth level corresponding to the control registers, using which individual instruction words executed by one or more of the functional units can be extended by bits in the control registers on a per-instruction-cycle basis."

This argument is found to be persuasive for the following reason. The examiner agrees these references failed to teach this limitation. However, a new ground of rejection has been given due to the amendment.

Conclusion

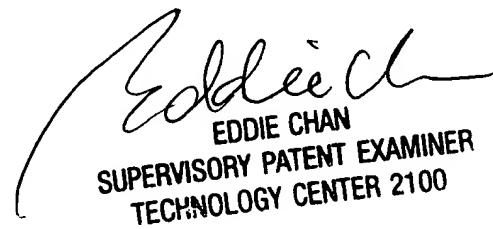
The following is text cited from 37 CFR 1.111(c): In amending in reply to a rejection of claims in an application or patent under reexamination, the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. The applicant or patent owner must also show how the amendments avoid such references or objections.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacob Petranek whose telephone number is 571-272-5988. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4162. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jacob Petranek
Examiner, Art Unit 2183



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